

## 3.3.12 HLC Sleeve Anchor

### 3.3.12.1 Product Description

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**Bolt Head (HLC-H)**



**Hex Nut - HLC-HX**



**Flat Phillips Head - HLC-FPH**



**Tie-Wire Head - HLC-T**



**Acorn Nut - HLC-AC**



**Round Head Slotted - HLC-RS**



**Rod Coupling - HLC-RC**

## 3.3.12.1 Product Description

Hilti HLC Sleeve Anchors are mechanical expansion anchors consisting of an externally threaded stud with an expanding sleeve for use in concrete and hollow and solid masonry base materials.

### Product Features

- Stud bolt type anchor design allows easy through-type fastenings and setting in bottomless hole.
- Pre-assembled anchor allows easy/fast installation.
- Anchor size is same as drill bit size allowing easy installation.
- Variety of head styles, lengths/sizes allow versatile application/use.
- Comprehensive testing to provide performance data in block, masonry/concrete base materials.

- Bulged mid-section with round and diamond shaped openings help prevent anchor from spinning in the hole or dropping out when being set overhead.

### Guide Specifications

**Expansion Anchor** Expansion anchors shall be stud or flush sleeve type and zinc plated in accordance with ASTM B633, Type II or stainless steel in accordance with AISI grade 304. Anchors shall be Hilti sleeve anchors as supplied by Hilti.

**Installation** Install sleeve anchors in holes drilled with Hilti carbide tipped drill bits. Install anchors in accordance with manufacturer's recommendations.

## 3.3.12.2 Material Specifications

Carbon steel sleeves and spacers are manufactured from cold rolled steel

Carbon steel anchors are zinc plated to minimum 5 µm thickness in accordance with ASTM B633, Type II

Stainless steel anchor material (stud, sleeve, nuts and washers) meet the requirements for AISI 304 stainless steel

## 3.3.12.3 Technical Data

### Sleeve Anchor Specification Table

		Anchor Size	in.	1/4	5/16	3/8	1/2	5/8	3/4
Details		(mm)	(6.4)	(7.9)	(9.5)	(12.7)	(15.9)	(19.1)	
d	Thread diameter	in.	3/16	1/4	5/16	3/8	1/2	5/8	3/4
d <sub>bit</sub>	Bit diameter <sup>1</sup>	in.	1/4	5/16	3/8	1/2	5/8	3/4	
<i>h</i> <sub>min</sub> minimum depth of embedment		in.	1	1	1-1/4	1-1/2	2	2	
		(mm)	(25)	(25)	(32)	(38)	(51)	(51)	
<i>h</i> <sub>o</sub> Minimum Hole depth		in.	1-3/8	1-3/8	1-3/4	2-1/8	2-5/8	2-5/8	
		(mm)	(35)	(35)	(45)	(54)	(67)	(67)	
<i>T</i> <sub>inst</sub> Installation torque	HLC-HX, FPH, AC, RS, RC	ft-lb	2.2	5	10	15	60	90	
		(Nm)	(3)	(6.8)	(13.6)	(20)	(81.4)	(122.1)	
	HLC-H	ft-lb	-	12	18	35	-	-	
		(Nm)		(16)	(24.4)	(47.4)			

1 Hilti carbide tipped drill bits

### Combined Shear and Tension Loading

$$\left( \frac{N_d}{N_{rec}} \right)^{5/3} + \left( \frac{V_d}{V_{rec}} \right)^{5/3} \leq 1.0 \quad (\text{Ref. Section 3.1.8.3})$$

**HLC Sleeve Anchor 3.3.12****Carbon Steel Sleeve Anchor Allowable Loads in Concrete<sup>1,2</sup>**

Sleeve Anchor Size in. (mm)	Bolt Diameter in. (mm)	Embedment Depth in. (mm)	2000 psi (13.8 MPa)		4000 psi (27.6 MPa)		6000 psi (41.4 MPa)	
			Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
1/4 <sup>3</sup> (6.4)	3/16 (4.8)	1 (25)	225 (1.0)	305 (1.4)	250 (1.1)	305 (1.4)	250 (1.1)	305 (1.4)
5/16 (7.9)	1/4 (6.4)	1 (25)	350 (1.5)	560 (2.5)	450 (2.0)	560 (2.5)	500 (2.2)	560 (2.5)
3/8 <sup>3</sup> (9.5)	5/16 (7.9)	1-1/4 (32)	450 (2.0)	870 (3.9)	565 (2.5)	870 (3.9)	700 (3.1)	890 (4.4)
1/2 (12.7)	3/8 (9.5)	1-1/2 (38)	675 (3.0)	1250 (5.6)	925 (4.1)	1325 (5.9)	1100 (4.9)	1325 (5.9)
5/8 (15.9)	1/2 (12.7)	2 (51)	1035 (4.6)	1750 (7.8)	1500 (6.7)	2295 (10.2)	1950 (8.7)	2295 (10.2)
3/4 (19.1)	5/8 (15.9)	2 (51)	1125 (5.0)	1750 (7.8)	1500 (6.7)	3000 (13.3)	1950 (8.7)	3010 (13.4)

1 Based on a safety factor of 4.0.

2 Refer to KWIK Bolt 3 data, in Section 3.3.6.4, for spacing and edge distance guidelines in Concrete.

3 For 1/4" and 3/8" flat phillips and round head anchors, shear values should be reduced by 57% due to the potential of the shear acting through the hollow portion of the head.

**Stainless Steel Sleeve Anchor Allowable Loads<sup>1</sup>**

Anchor Size in. (mm)	Embedment Depth in. (mm)	Concrete <sup>2</sup>				Hollow C-90 Concrete Block <sup>3,4</sup>	
		2000 psi (13.8 MPa)		4000 psi (27.6 MPa)			
		Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)	Tension lb (kN)	Shear lb (kN)
1/4 (6.4)	1-1/8 (29)	235 (1.0)	450 (2.0)	300 (1.3)	450 (2.0)	200 (0.9)	400 (1.8)
5/16 (7.9)	1-1/4 (32)	310 (1.4)	675 (3.0)	410 (1.8)	675 (3.0)	335 (1.5)	600 (2.7)
3/8 (9.5)	1-1/2 (38)	450 (2.0)	1000 (4.4)	600 (2.7)	1000 (4.4)	470 (2.1)	890 (4.0)

1 Based on using a safety factor of 4.0.

2 Refer to KWIK Bolt 3 data, in Section 3.3.6.4 for spacing and edge distance guidelines in Concrete.

3 ASTM Specification C90, Type II.

4 Refer to HY 20 data, in Section 3.2.9.3, for spacing and edge distance guidelines in Hollow Concrete Block.

**Carbon Steel Sleeve Anchor Allowable Loads  
in Grout Filled Block<sup>1,2,3,4,5,6,7</sup>**

Anchor Size in. (mm)	Embed. Depth in. (mm)	Edge Distance in. (mm)	Tension lb (kN)	Shear lb (kN)
1/4 (6.4)	1 (25)	4 (101)	290 (1.3)	305 (1.4)
		≥ 12 (305)		
5/16 (7.9)	1 (25)	4 (101)	385 (1.7)	500 (2.2)
		≥ 12 (305)		
3/8 (9.5)	1-1/4 (32)	4 (101)	435 (1.9)	725 (3.2)
		≥ 12 (305)		
1/2 (12.7)	1-1/2 (38)	4 (101)	605 (2.7)	865 (3.8)
		≥ 12 (305)		
5/8 (15.9)	2 (51)	4 (101)	710 (3.2)	1050 (4.7)
		≥ 12 (305)		
3/4 (19.1)	2 (51)	4 (101)	840 (3.7)	1050 (4.7)
		≥ 12 (305)		

1 Values are for Lightweight, Medium Weight or Normal Weight concrete masonry units conforming to ASTM C90 with 2000 psi grout conforming to ASTM C474.

2 Embedment depth is measured from the outside face of the concrete masonry unit.

3 Values are for anchors located in the grouted cell, bed joint, cross web or any combination of the above.

4 For anchors installed in the "T" joint or head joint reduce tension values by 20%.

5 Values for edge distances between 4 inches and 12 inches may be calculated by linear interpolation.

6 Anchors are limited to one per unit cell.

7 Based on using a safety factor of 4.0.

**Carbon Steel Sleeve Anchor Allowable Loads  
in Hollow Concrete Block<sup>1,2,3</sup>**

Sleeve Anchor Size in. (mm)	Embedment Depth in. (mm)	Tension lb (kN)	Shear lb (kN)
1/4 (6.4)	1 (25)	350 (1.5)	305 (1.4)
5/16 (7.9)	1 (25)	375 (1.7)	560 (2.5)
3/8 (9.5)	1-1/4 (32)	435 (1.9)	800 (3.5)
1/2 (12.7)	1-1/2 (38)	565 (2.5)	1125 (5.0)

1 Based on using a safety factor of 4.0.

2 ASTM Specification C90, Type II.

3 Refer to HY 20 data, in Section 3.2.9.3, for spacing and edge distance guidelines in Hollow Concrete Block.

**Carbon Steel Sleeve Anchor Allowable Loads  
in Clay Brick<sup>1,2,3</sup>**

Anchor Size in. (mm)	Embedment Depth in. (mm)	Tension lb (kN)	Shear lb (kN)
1/4 (6.4)	1 (25)	295 (1.3)	335 (1.5)
5/16 (7.9)	1 (25)	345 (1.5)	530 (2.3)
3/8 (9.5)	1-1/4 (32)	375 (1.7)	850 (3.8)
1/2 (12.7)	1-1/2 (38)	435 (1.9)	1230 (5.5)

1 Based on using a safety factor of 4.0.

2 Due to wide strength variations encountered in masonry, these values should be considered as guide values.

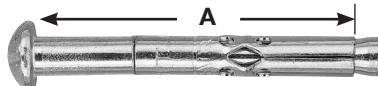
3 Refer to HY 20 data, in Section 3.2.9.3, for spacing and edge distance guidelines in brick.

### **3.3.12 HLC Sleeve Anchor**

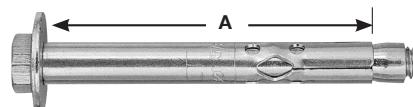
#### **3.3.12.4 Installation Instructions**

Installation Instructions For Use (IFU) are included with each product package. They can also be viewed or downloaded on-line at [www.us.hilti.com](http://www.us.hilti.com) (US) and [www.hilti.ca](http://www.hilti.ca) (Canada) -- "Service/Technical Info >> Technical Downloads >> Anchoring Systems". Because of the possibility of changes, always verify that downloaded IFU are current when used. Proper installation is critical to achieve full performance. Training is available on request. Contact Hilti Technical Services for applications and conditions not addressed in the IFU.

#### **3.3.12.5 Ordering Information**

**Round Head Slotted (RS)**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-RS 1/4 x 1-1/4	1/4	3/16	1 (25)	1/4 (6.4)	100
HLC-RS 1/4 x 2	1/4	3/16	1 (25)	1 (25)	100
HLC-RS 1/4 x 4	1/4	3/16	1 (25)	3 (76)	100

**Bolt Head (H)**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-H 5/16 x 1-5/8	5/16	1/4	1 (25)	5/8 (16)	100
HLC-H 5/16 x 2-5/8	5/16	1/4	1 (25)	1-5/8 (41)	100
HLC-H 3/8 x 1-7/8	3/8	5/16	1-1/4 (32)	5/8 (16)	50
HLC-H 3/8 x 3	3/8	5/16	1-1/4 (32)	1-3/4 (44)	50
HLC-H 1/2 x 2-1/4	1/2	3/8	1-1/2 (38)	3/4 (20)	50
HLC-H 1/2 x 3	1/2	3/8	1-1/2 (38)	1-1/2 (38)	25
HLC-H 1/2 x 4	1/2	3/8	1-1/2 (38)	2-1/2 (64)	25

**Flat Phillips Head (FPH)**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-FPH 1/4 x 1-3/8	1/4	3/16	1 (25)	3/8 (10)	100
HLC-FPH 1/4 x 2	1/4	3/16	1 (25)	1 (25)	100
HLC-FPH 1/4 x 3	1/4	3/16	1 (25)	2 (51)	100
HLC-FPH 1/4 x 4	1/4	3/16	1 (25)	3 (76)	100
HLC-FPH 3/8 x 2-7/8	3/8	5/16	1-1/4 (32)	1-1/2 (38)	50
HLC-FPH 3/8 x 4	3/8	5/16	1-1/4 (32)	2-3/4 (70)	50
HLC-FPH 3/8 x 5	3/8	5/16	1-1/4 (32)	3-3/4 (95)	25
HLC-FPH 3/8 x 6	3/8	5/16	1-1/4 (32)	4-3/4 (120)	25

<sup>1</sup> Hilti carbide tipped drill bits

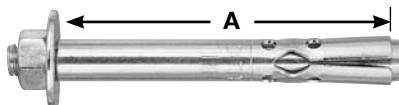
#### **Definition of Nomenclature**

Outside diameter of sleeve, see tables for threaded bolt diameter

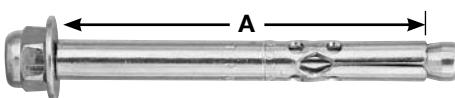
**HLC-AC 1/4 X 1-3/8**

Nut Configuration

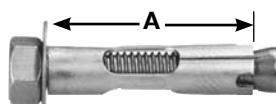
A: the overall length from bottom of washer to end of sleeve

**HLC Sleeve Anchor 3.3.12****Hex Nut (HX)**

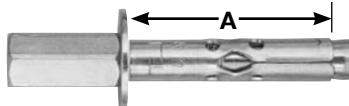
Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-HX 5/16 x 1-5/8	5/16	1/4	1 (25)	1/2 (38)	100
HLC-HX 5/16 x 2-5/8	5/16	1/4	1 (25)	1/2 (13)	100
HLC-HX 3/8 x 1-7/8	3/8	5/16	1-1/4 (32)	5/8 (16)	50
HLC-HX 3/8 x 3	3/8	5/16	1-1/4 (32)	1-3/4 (44)	50
HLC-HX 1/2 x 2-1/4	1/2	3/8	1-1/2 (38)	3/4 (19)	25
HLC-HX 1/2 x 3	1/2	3/8	1-1/2 (38)	1-1/2 (38)	25
HLC-HX 1/2 x 4	1/2	3/8	1-1/2 (38)	2-1/2 (64)	25
HLC-HX 1/2 x 6	1/2	3/8	1-1/2 (38)	4-1/2 (114)	15
HLC-HX 5/8 x 2-1/4	5/8	1/2	2 (51)	1/4 (6)	25
HLC-HX 5/8 x 4-1/4	5/8	1/2	2 (51)	2-1/4 (57)	10
HLC-HX 5/8 x 6	5/8	1/2	2 (51)	4 (102)	10
HLC-HX 3/4 x 2-1/2	3/4	5/8	2 (51)	1/2 (13)	10
HLC-HX 3/4 x 4-1/4	3/4	5/8	2-1/2 (64)	1-3/4 (44)	10
HLC-HX 3/4 x 6-1/4	3/4	5/8	2-1/2 (64)	3-3/4 (95)	10

**Acorn Head (AC)**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-AC 1/4 x 1-3/8	1/4	3/16	1 (25)	3/8 (10)	100
HLC-AC 1/4 x 2-1/4	1/4	3/16	1 (25)	1-1/4 (32)	100

**304SS Sleeve Anchors**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Fastens Materials Up To in. (mm)	Box Qty
HLC-HX 304SS 1/4 x 2-1/4	1/4	3/16	1-1/8 (29)	1-1/8 (29)	100
HLC-HX 304SS 5/16 x 1-1/2	5/16	1/4	1-1/4 (32)	1/4 (6.4)	100
HLC-HX 304SS 5/16 x 2-1/2	5/16	1/4	1-1/4 (32)	1-1/4 (32)	100
HLC-HX 304SS 3/8 x 1-7/8	3/8	5/16	1-1/2 (38)	3/8 (9.5)	50
HLC-HX 304SS 3/8 x 3	3/8	5/16	1-1/2 (38)	1-1/2 (38)	50

**Rod Coupling (RC)**

Description	Bit Diameter <sup>1</sup> In.	Bolt Diameter In.	Minimum Embed. Depth in. (mm)	Rod Coupler	Box Qty
HLC-RC 3/8 x 1-7/8	3/8	5/16	1-1/4 (32)	5/16" x 3/8"	50
HLC-RC 1/2 x 2-1/4	1/2	3/8	1-1/2 (38)	3/8" x 1/2"	25

1 Hilti carbide tipped drill bits

**Definition of Nomenclature**

Outside diameter of sleeve, see tables for threaded bolt diameter

**HLC-AC 1/4 X 1-3/8**

Nut Configuration

A: the overall length from bottom of washer to end of sleeve